

REMARKS

Reconsideration is requested.

The claims in the case are original claims 1-13 and newly added claim 14. The new claim is drawn to preferred feature of the invention and find support in the applicants' disclosure at, for example, page 4, lines 15-25. The new claim is thought to be allowable for reasons noted in the discussion of the Examiner's rejections as well as for the specific features recited therein.

As the Examiner will appreciate, the applicants' invention is concerned, in one embodiment, with a process for preparing certain polymers that are particularly useful as fixing agents to reduce highlighter smear of prints prepared by ink-jet printing. Smearing of such prints is a real problem and the applicants' invention is directed towards solving this problem.

The polymer the applicants use in their invention is a chain extended thermoplastic polymer which, as the applicants' claims bring out, is applied as a fixing composition to the substrate used in an ink-jet printing process on which an ink image is applied by an ink-jet printer before or after application of the fixing composition.

Claims 1-5 are drawn to the applicants' process for making the chain extended thermoplastic polymer; claim 6 is directed to the resulting polymer; claim 7 is drawn to the applicants' fixing composition while claim 8 defines an ink-jet printing process which uses the applicants' fixing composition to fix an image formed by ink-jet printer; claim 9 covers the resulting printed substrate while claims 10-13 are directed to recording sheets, a set of liquids comprising the applicants' fixing composition and ink; and an ink-jet cartridge including the applicants' fixing composition.

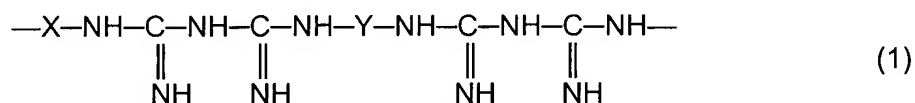
New claim 14 is directed, as earlier noted, to a preferred aspect of the applicants' process as defined in claim 1.

As claim 1 brings out, the applicants' chain extended thermoplastic polymer is prepared by reacting a prepolymer of Formula (1) and a chain extender having at least two groups able to react with the nucleophilic groups (Z) in Formula (1). The Z end groups preferably are amino groups while the reactive groups of the chain extender may be isocyanate or epoxide.

The Examiner has rejected applicants' claims 1 and 2 under 35 U.S.C. 103(a) as unpatentable over Bennett (U.S. 4,559,058) in view of Lavery et al. (WO 00/37258). The applicants respectfully submit that the Examiner's rejection is in error and should be withdrawn as there is no motivation in the art to combine the references as the Examiner proposes and there is clearly nothing in the references, no matter how considered, which would suggest the applicants' invention. The Examiner's rejection is based on nothing more than hindsight in the light of the applicants' disclosure. This is not in any sense a proper basis for rejection.

Bennett is concerned with a precondensate which is useful as an after-treatment agent to improve the fastness of dyeings and optical brightenings. The precondensate is obtained by reacting (A) the product obtained by reacting a mono- or poly-functional primary or secondary amine with, for example, cyanamide and (B) an epihalohydrin or precursor thereof. The patent has nothing to do with ink-jet printing or problems incident thereto.

Lavery is concerned with the use of polymeric biguanides in an ink-jet printing process. The polymeric biguanides have the formula:



where X and Y are divalent organic linking groups.

The Examiner's combination of Bennett and Lavery is a completely artificial one. The references are totally foreign to each other and one in the ink-jet printing art would not look to Bennett and one concerned with improving dye properties would not look to Bennett. This alone should be dispositive of the Examiner's Section 103(a) rejection of claims 1 and 2, and the related Section 103(a) rejection of all claims based on the same references.

Putting aside the totally unrelated nature of the Bennett and Lavery disclosures, the references themselves include features which preclude any valid basis for combining the references to reject the applicants' claims as obvious. For example, Bennett et al. make it clear that their component (A) must contain reactive hydrogen atoms bound to a nitrogen atom (Col. 1, lines 49-52) and it is clear from the context that the word "reactive" in Bennett et al. means

reactive towards component (B), the epihalohydrin or a precursor thereof.

Because of their chemistry, the hydrogen atoms bound to nitrogen atoms in biguanide or monoguanide groups are not readily reactive towards epihalohydrin. This is consistent with applicants' claim 1 wherein the nucleophilic groups (Z) at either end of the prepolymer of Formula (1) provide the reactive groups which can be chain extended.

The hydrogen atoms bound to nitrogen atoms in the biguanide unit are even less reactive when protonated with, for example, acid. Acidification is an essential feature of Bennett et al. (Col. 1, lines 51-53).

If it were the case that the hydrogen atoms bound to nitrogen atoms in the biguanide group were reactive, it would be difficult, if not impossible, to prepare a non-gelled precondensate as required by Bennett et al. because the three NH groups per biguanide group would react along with the end groups (e.g. -NH- and -NH_2 groups) to form a gel (Col. 1, lines 54-56).

Accordingly, it is clear that an essential feature of Bennett et al. is that there be hydrogen atoms bound to nitrogen atoms which are not a part of a guanide or biguanide group (e.g. end groups).

In contrast to Bennett et al., Formula (1) of Lavery et al. does not disclose any end groups at all, it merely discloses the repeat unit. In fact, Lavery et al. regards the end groups as unimportant (page 1, lines 29-30, Formula (A) and page 2, lines 14-15). The preferred terminating groups in Lavery et al. are C_{1-4} alkyl, halo (especially Cl), nitro and C_{1-4} alkoxy (especially methoxy). None of these groups contains a nitrogen atom. Also, none of these groups are nucleophilic as required by applicants' claim 1 and Lavery does not disclose any chain extension, as the applicants require.

Accordingly, Lavery et al. do not disclose:

- i) chain extension (an essential of the applicants' invention);
- ii) the importance of groups having a hydrogen bound to nitrogen atom which are not a part of the biguanide group;

and instead, Lavery et al. point away from Bennett et al. or the presently pending claim by:

- iii) highlighting the unimportance of the end groups;

- iv) preferring groups which cannot be chain extended, are not nucleophilic and do not contain a hydrogen atom bound to a nitrogen atom.

In short, the person of ordinary skill would not find it obvious to start from Bennett et al. and consider it with Lavery et al. because the two are directed to two fundamentally different concepts and concerns. For example, Lavery et al. do not disclose chain extension and instead, point away from it. This would hardly be suggestive of the applicants' invention.

It is respectfully submitted that the foregoing comments should alone be sufficient to show that the Examiner's reference combination is not warranted on the basis of the teachings of the references. Simply stated, one in the art would not consider a reference which points away from chain extensions (Lavery et al.) with a reference which requires it (Bennett et al.). This is particularly so when one considers the substantively different arts that are involved in Bennett et al. and Lavery et al. Thus, any property benefits Examiner's claims to provide motivation to make the reference combination (high point quality or high optical brightness) become irrelevant when one looks at the two totally different chemistries of the references. It is also significant that neither of the references is in any way concerned with the problem (smearing) dealt with by the applicants. This underscores the unobviousness of the applicants' invention as there is nothing in the references, no matter how considered, to suggest that the applicants' novel combination of features would give the results obtained by the applicants.

In connection with the above, it is noted that the rejection of claims 1 and 2, the Examiner alleges that the motivation for starting with Bennett et al. and combining it with Lavery et al. is the provision of a high quality printed image. However, as indicated above, the Examiner's reference combination is far from obvious given, for example, that there is nothing in Lavery et al. which discloses or suggests chain extension and neither reference is concerned with the problem dealt with and solved by the applicants. It is fundamentally different to obtain, as the Examiner puts it, a "high quality printed image" and to obtain a high quality printed image that does not smear when highlighted. Nothing in either of the references suggests how to deal with the smearing problem.

As further support for the unobviousness of the applicants' invention, it is noted that there is nothing in either reference that suggests that the precondensates in Bennett et al. would be suitable for ink-jet printing, which is needed to provide the high print quality required in Lavery et al. Thus, there is no motivation to combine these documents. The disclosure in Bennett et al. of printing per se does not provide any expectation of success in ink-jet printing as ink jet is a form of printing with particularly stringent requirements. In fact, the person of ordinary skill might well expect that chain extension would adversely affect ink viscosity (raised because of increased molecular weight and operability (because the precondensates in Bennett et al. appear to be reactive (Col. 3, line 66 to Col. 4, line 4)).

It is also noted that in the related rejection of all claims on the same references, the Examiner alleges the motivation for starting with Lavery et al. and combining it with Bennett et al. is the provision of higher optical brightness. It is beyond belief that one would look to Bennett et al. if he was looking to improve ink-jet printing images. Bennett et al. are concerned with textile treatments which have nothing to do with ink-jet printing. Clearly, if one was starting from Lavery et al. to obtain some sort of improved ink-jet printing images, the person of ordinary skill would only be expected to look to those documents which disclose inventions and compositions suitable for ink-jet printing and, therefore, compatible with the teaching of Lavery et al. Bennett et al. do not make such a disclosure and provide no relevant teaching for ink-jet printing.

It is respectfully submitted, in view of the foregoing, that the Examiner should withdraw the Section 103(a) rejection of claims 1 and 2 based on Bennett et al. and Lavery et al. For similar reasons, the Examiner is urged to reconsider his Section 103(a) rejection of claims 1-13 based on Lavery et al. considered with Bennett as urged by the Examiner in Part 2 of the action. The references, no matter how considered, do not make the applicants' invention obvious. There is clearly no valid reason to consider the references together, in view of the substantive technology differences between the two references. However, even if the references are considered together, the applicants' invention does not result.

One further point to note is that applicants' claim 1 requires that R is a C₆-alkylene group. Bennett et al. points away from selecting C₆-alkylene. Thus, at Col. 2, lines 10-14,

Bennett et al. disclose a preference for diethylene triamine, triethylene tetramine, tetraethylene pentamine, 2-aminoethyl-3-amino propylamine, dipropylene triamine and N,N-bis-(3-amino propyl) methylamine. None of these are C₆ alkylamines. This is a further reason for finding unobviousness in the applicants' claims.

For the reasons indicated, the Examiner is requested to reconsider the Section 103(a) rejections and allow the application. Such action is requested.

Respectfully submitted,

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